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Cutlassfishes of the Genus *Lepidopus* (Trichiuridae), with Two New Eastern Pacific Species

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Abstract Three of the five known species of *Lepidopus* occur in the eastern Pacific. *Lepidopus manis* sp. nov. is described from a single specimen from the Galápagos Islands. The holotype of *L. xantusi* Goode et Bean, 1895, supposedly from Cape San Lucas, Lower California, is shown to be conspecific with *L. caudatus* (Euphrasen, 1788). The species heretofore reported under the name *L. xantusi* is described, and named *L. fitchi* sp. nov. It ranges from Oregon to the Gulf of California and occurs disjunctly in southern Ecuador and northern Peru. A key to the described species of *Lepidopus* is given and certain morphological features of *L. caudatus* are described. Geographic variability of *L. caudatus* and *L. fitchi* is discussed.

The cutlassfishes of the genus *Lepidopus* were last reviewed by Tucker (1956) in his preliminary revision of the Trichiuridae. However, he gave data on but two specimens of *L. caudatus*, and had no material of the other putative species, *L. xantusi*. Since that time five important contributions have appeared; Fitch and Gotshall (1972) and Mikhaylin (1982) provided data on Northeast and Southeast Pacific specimens of *Lepidopus* and Mikhaylin (1977) has discussed variability in *L. caudatus*. Parin and Mikhaylin (1981) described a new species from the Southeastern Atlantic, *L. dubius*, and established that Tucker's (1957) record of *Evoxymetopon taeniatus* represents an additional undescribed species from the western Atlantic. Recently, Parin and Mikhaylin (1982) have described a new species, *L. calcar*, from Colahan Seamount, on the Hawaiian Ridge in the Central Pacific.

Our interest in the genus was occasioned by a specimen in the Scripps Institution collection which did not appear to be referable to any known species. Our study indicates that there are two undescribed species of *Lepidopus* in the eastern Pacific. It is the purpose of this paper to distinguish the species of the genus and describe and name the two eastern Pacific species.

Materials and methods

The specimens examined in this study are housed in the following institutions: California Academy of Sciences (CAS), National Museum of Natural History (USNM), Oregon State University (OS), Scripps Institution of Oceanography (SIO), and Department of Biology, University of California, Los Angeles (UCLA). Paratypes of *L. fitchi* sp. nov. will be deposited at USNM, CAS and the British Museum (Natural History). Measurements and counts follow the methods of Hubbs and Lagler (1958); counts were obtained from radiographs or cleared and stained specimens. The presence of rudimentary pelvic soft-rays could only be determined from cleared and stained material. All specimen lengths are standard lengths.

Lepidopus Gouan, 1770

Among the trichiurids with pelvics and a caudal fin, *Lepidopus* differs from *Assurger* and *Evoxymetopon* in lacking a sagittal crest running from the snout to the dorsal origin, producing a convex profile, and from *Diplospinus*, *Aphanopus*, and *Benthodesmus* in having a continuous dorsal fin without a notch. It differs further from the latter genera in having 9 rather than 30 or more dorsal spines.

Key to the species of *Lepidopus*

1a. Dorsal rays 91–110, vertebrae 98–114.....2
1b. Dorsal rays 78–89, vertebrae 84–96.....3
2a. Premaxillary fangs barbed at tip, second anal spine flattened and plate-like, dorsal rays 98–110, anal rays II, 59–66, vertebrae 105–114...

L. caudatus (Euphrasen). North and South Atlantic and Southwest Pacific

2b. Premaxillary fangs smooth, second anal spine elongated, stout and spur-like, dorsal rays 91–93, anal rays II, 44–47, vertebrae 98–100... *L. calcar* Parin et Mikhaylin. Central Pacific

3a. Head length more than six (6.6) in standard length. Body depth about 16 in standard length. Second anal spine large, with a strong medial ridge and its margins flaring laterally.....*L. dubius* Parin et Mikhaylin. Southeast Atlantic

3b. Head length less than six (4.2–5.3) in standard length. Body depth 9 to 13 in standard length. Second anal spine flat and triangular 4

4a. Eye large, fleshy orbit 4 in head length; caudal span greater than length of upper caudal lobe. Dorsal rays 89, vertebrae 94.....***L. manis*** sp. nov. Galápagos Islands

4b. Eye smaller, fleshy orbit 5 or more in head length, caudal span less than length of upper caudal lobe. Dorsal rays 78–86, vertebrae 78–92.....***L. fitchi*** sp. nov. Eastern Pacific

Lepidopus caudatus (Euphrasen, 1788)

References in the synonymy given by Tucker (1956) are not repeated here.

Lepidopus caudatus: Jordan and Gilbert, 1882: 358. Goode and Bean, 1895: 203. Jordan and Evermann, 1896: 886, 1900, pl. 136, fig. 373.

Lepidopus xantusi Goode and Bean 1895: 519. Holotype USNM 10115, Cape San Lucas, Lower California, Mexico.

Description. Based on CAS 10553, Canary Islands, 1048 mm. Ranges in parentheses for Southeastern Atlantic specimens recalculated from Mikhaylin (1977). Fin ray counts and vertebral counts from Tucker (1956), Mikhaylin (1977), and Scott (1962).

D IX, 98–110; A II, 59–66; P_1 12, P_2 I, ?; Vertebrae 105–114; Br 7; GR 12+1+8 (16–21).

Body depth at pelvics 18 (12.3–14.9), and depth at caudal peduncle 228 in standard length (SL). Body strongly compressed, ribbon-like. Head 8 (5.7–6.8) in SL. Eye large, 4.8 in head and 1.8 in snout, barely entering profile of head. Interorbit 1.6 in eye, snout 2.7 in head. Mouth large, maxilla ending just before anterior margin of pupil, upper jaw included; symphysis of mandible sloping upward at a steep angle from an anterior knob. Teeth flattened, lanceolate, premaxillary fangs barbed at tip. An outer row of 21 teeth on left dentary. No teeth on vomer or tongue. A single row of small, conical teeth along palatine. Nostril an elongate oval about one-fifth snout length before eye. Interorbit concave, with a trough between elevated ridges over eyes, trough continued posteriorly between converging frontal crests at rear margin of eyes. Frontal crests rising over posterior part of eye, elevated at confluence, which is at posterior margin of eye. A ridge formed by first pterygiophore extends from dorsal origin almost to apex of frontal confluence, forming a sagittal crest. Posterior margin of opercle evenly rounded. Dorsal origin at anterior juncture of opercular bone with head. Dorsal rays damaged in available specimen, but no elements are branched or segmented. According to Tucker (1956) there are nine spinous elements in the species, as is the case in our specimen. Origin of anal in middle third of body length. Only second anal spine externally obvious, flattened and covered by skin. First spine represented by a thickening of the skin. Only last 23 anal rays protrude beyond body outline.

Caudal peduncle very slender, its depth about 5 in its length. Caudal well developed and lunate, length of upper lobe about 3 in head. Length of upper lobe about equal to caudal span.

Pectorals inserted low on body, lower corner of base just below level of lower border of orbit. Lower rays of pectoral the longest. Pelvic girdle present, each pelvic fin represented by a flattened, plate-like spine.

Lateral line originates at upper corner of opercle, curves concavely downward to midline, which is reached about 0.8 head lengths behind head, then descends gradually so that it is on lower third of side just before its termination, which is about at end of anal base.

Color. Accounts agree that the fish is silver in life, as indicated by the common name "frostfish". Mikhaylin (1977) reported the occurrence of black pigmentation on the membrane between the first and third and seventh to ninth dorsal rays in specimens from the South Atlantic. Scott (1962) reported the occurrence of the I–III spot but made no mention of the VII–IX spot in New Zealand *L. caudatus*. According to Mikhaylin,

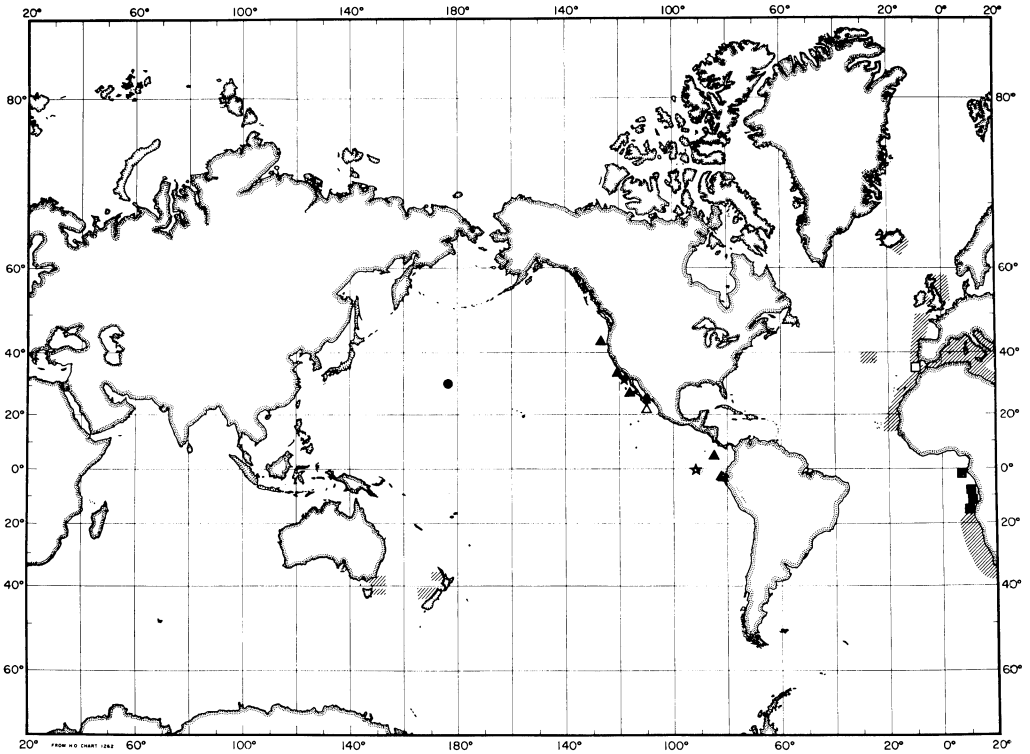

Fig. 1. Distribution of 5 species of *Lepidopus*. Shaded area, range of *L. caudatus* (open square, Gettysburg Seamount). Solid squares, records of *L. dubius*. Solid triangles, records of *L. fitchi* (solid star, type locality), Open triangle, type locality of *L. xantusi*. Open star, type locality of *L. manis*. Solid circle, type locality of *L. calcar*.

specimens from the Azores and the Canary Islands lack this conspicuous black pigmentation and have instead a blackish-gray dorsal fin.

Distribution. Norway, Canary Islands, and Cape Frio to Agulhas Bank in the eastern Atlantic; Mediterranean (Parin and Becker, 1973); South Australia, Tasmania, New Zealand in the western Pacific (Scott, 1962); Cape San Lucas, Baja California (see "Remarks" under *L. fitchi*) (Fig. 1).

Remarks. Mikhaylin (1977) conducted an extensive variation study of *L. caudatus* in the Atlantic. He established that samples from the Azores and the Canary Islands differ from samples from South Africa in dorsal and anal rays and vertebrae (Figs. 2–4). This led him to conclude that the two populations have diverged at the subspecific level although he did not propose a name for the northern population. However, Mikhaylin's data indicate that he was not dealing with allopatric populations. His sample from Gettysburg Seamount (36°32′N, 11°37′W) in the northern region agreed with the southern population in vertebral and dorsal counts. The presence of the Gettysburg Seamount population of southern type fish is puzzling; no specimen has been reported from between about 12°N and 17°S. Nevertheless, it does indicate that the meristic differences noted by Mikhaylin are maintained in sympatry and probably warrant recognition at the species level. The Gettysburg Seamount population does differ somewhat from both North Atlantic and South African material in anal ray number. Although Mikhaylin's study forms a solid basis for understanding *Lepidopus caudatus, sensu lato*, it is clear that adequate material from more localities, including the Mediterranean, Australia, and New Zealand must be examined.

Lepidopus manis sp. nov.

(Fig. 5)

Material. Holotype, SIO 62-624. A 691 mm male from Webb Cove, Isla Isabela, Galápagos Islands; found dead in the cove, January 10, 1951.

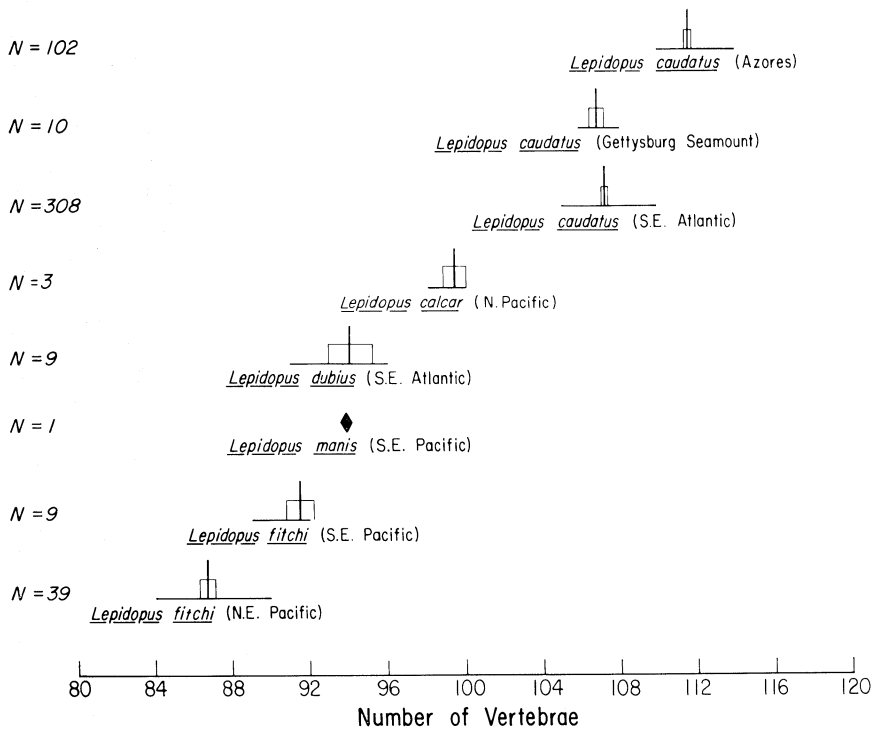

Fig. 2. Vertebral counts of 5 species of *Lepidopus*. Horizontal line is range, vertical line is mean, and hollow bar indicates 95% confidence limits of mean.

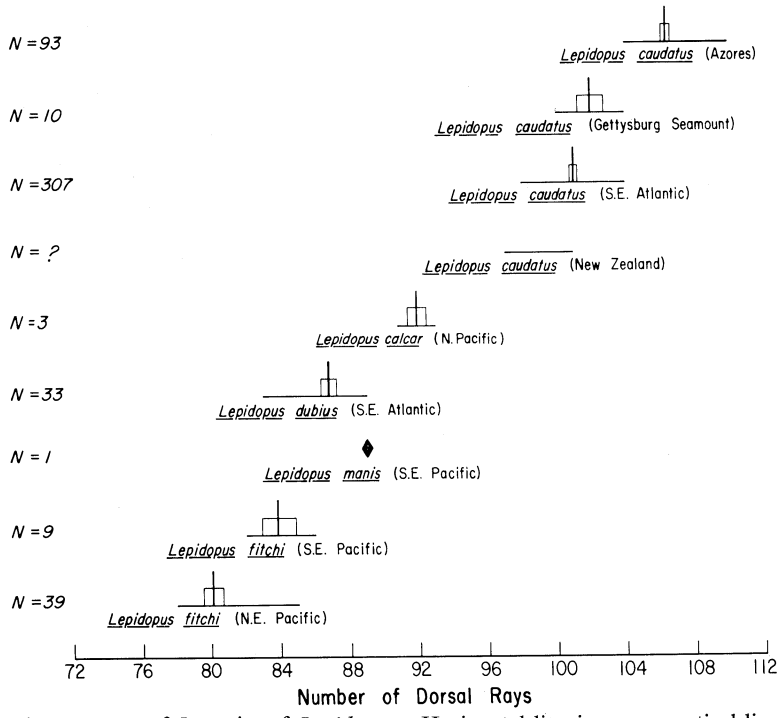

Fig. 3. Dorsal ray counts of 5 species of *Lepidopus*. Horizontal line is range, vertical line is mean, and hollow bar indicates 95% confidence limits of mean.

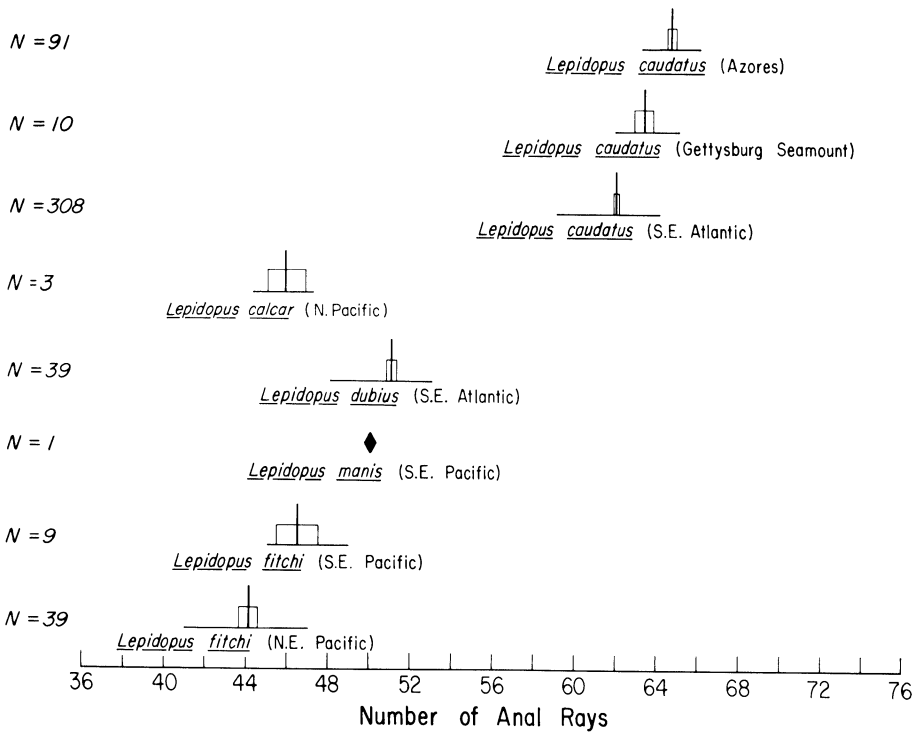

Fig. 4. Anal ray counts of 5 species of *Lepidopus*. Horizontal line is range, vertical line is mean, and hollow bar indicates 95% confidence limits of mean.

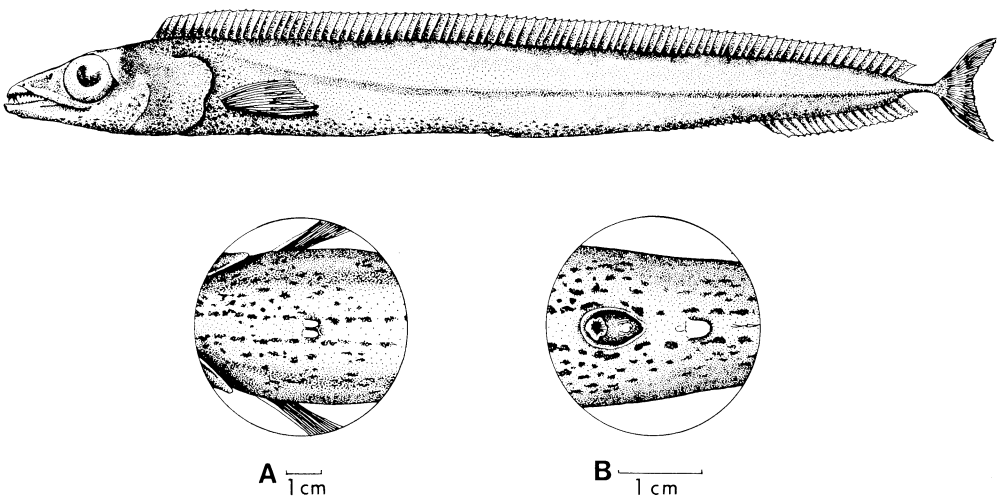

Fig. 5. Holotype of *Lepidopus manis* (SIO 62-624), a 691 mm male; inset A, ventral view showing pelvic spines; inset B, anus and flattened second anal spine.

Description. D IX, 89; A II, 50; P_1 12; P_2 I, ?; Vertebrae 37+57; Br 7; GR 9+15.

Measurements of the holotype are in Table 1. Body only moderately elongate for a trichiurid, greatest body depth 9.1, depth at anus 13.4 and depth of caudal peduncle 123 in SL. Body strongly compressed. Head large, 4.2 in SL. Eye large, 3.9 in head and 1.3 in snout, entering upper pro-

file of head and bulging laterally. Interorbit narrow, 1.8 in eye, snout 3.0 in head.

Mouth large, maxilla ending about at anterior margin of pupil. Lower jaw slightly projecting; symphysis of mandible vertical, with a poorly developed knob. Teeth flattened, lanceolate, their margins entire, without barbs. An outer row of 29 teeth (left side) and an inner row of 3 fangs on each premaxilla. Twenty-six teeth on left dentary. No teeth on vomer, palatines, or tongue. Nostril a slit, about one-fourth snout-length before eye. Upper profile of head rises at 30° from snout to top of eyes, then flattens to a more gradual slope to dorsal origin.

Interorbit concave, with a trough between elevated ridges over eyes, trough continued posteriorly between converging frontal crests to just behind rear margin of eye. No median sagittal crest, but a short ridge before dorsal origin formed by first pterygiophore. Posterior margin of opercle with a shallow concavity at level of pectoral base.

Dorsal origin at anterior juncture of opercular bone with head. Dorsal not particularly high, rays in middle of fin about 4.3 in head, posteriormost rays about one-half as long as middle rays. None of the dorsal rays segmented or branched. The first ten rays are more robust than the succeeding elements, and may be spinous, with the remainder soft-rays. Origin of anal in middle one-third of body length. Only second anal spine externally obvious, flattened and covered by skin. Anterior to this a small, movable nodule represents the first spine. Only last 24 anal soft rays can be raised beyond body outline and are joined by a membrane to form a fin. Caudal peduncle very slender, its depth about five in its length. Caudal well developed and lunate, length of a lobe about 3 in head. Length of upper lobe 1.3 in span of caudal between tips.

Pectoral inserted low on body, lower corner of base just below level of lower border of orbit. Lower pectoral rays longer than upper, so that rear margin of pectoral slopes obliquely backward. Pectoral about 2.2 in head. Pelvic fins represented by a pair of flattened, plate-like spines covered by skin, but free from the body posteriorly. Rudimentary soft-rays were not found by our dissection, but are probably present.

Lateral line originates at upper corner of opercle, curves concavely downward to body midline at about 1.5 head lengths behind head, then gradually descends to lower third of side just before terminating posterior to end of anal base.

Color in alcohol. Body light tan (probably

Table 1. Morphometrics of two new *Lepidopus* species.

Measurement	*L. manis* Holotype	*L. fitchi* Holotype	*L. fitchi* (northern)				*L. fitchi* (southern)			
			n	Range	Mean	S.D.	n	Range	Mean	S.D.
Standard length (mm)	691	750	35	225–870	—	—	7	315–560	—	—
In thousandths of standard length										
Preanal length	521	522	35	490–582	545.4	21.8	4	373–514	461.7	61.3
Prepelvic length	226	240	35	215–259	241.7	10.3	4	229–255	240.0	11.0
Head length	229	213	35	143–239	204.7	30.2	7	182–230	204.7	17.6
Predorsal length	159	137	35	120–153	138.0	7.6	5	132–151	138.8	7.6
Head depth	90	83	35	64– 90	80.1	6.3	5	73– 84	77.2	4.3
Depth at pelvic	106	101	35	75–109	92.4	8.7	4	75– 95	85.3	8.2
Depth at anal	72	79	35	66– 88	76.7	6.0	4	72– 77	73.8	2.2
In thousandths of head length										
Upper jaw length	372	350	35	314–356	339.0	11.4	7	325–402	355.9	26.0
Snout length	334	346	35	318–403	335.2	17.9	4	306–337	319.3	13.8
Pectoral length	416	386	34	308–502	399.8	51.4	4	378–508	437.0	58.2
Fleshy orbit	252	178	35	145–198	177.1	11.9	5	158–193	175.4	16.4
Bony interorbital	142	126	35	97–137	115.7	9.6	6	109–121	116.3	5.3
Caudal span	423	209	33	103–320	195.4	57.9	4	183–262	218.0	41.1
Upper caudal lobe	334	297	35	251–327	288.2	19.4	4	286–295	290.3	3.8
Middle caudal ray	120	121	35	94–183	128.0	18.3	4	129–142	133.3	5.9
Caudal peduncle length	158	177	35	121–216	163.1	25.2	4	122–195	151.5	34.0
Caudal peduncle depth	32	35	35	27– 44	31.6	3.4	4	29– 33	30.5	1.9

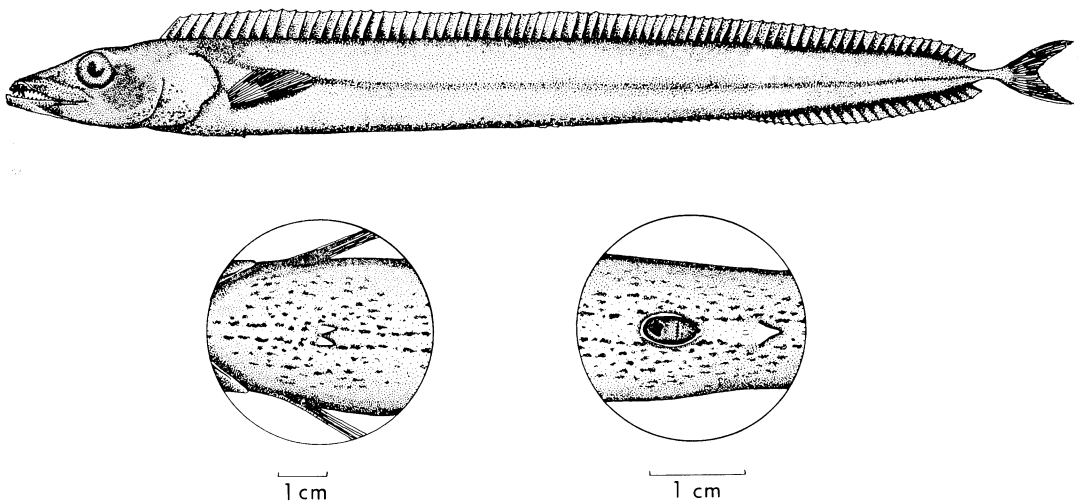

Fig. 6. Holotype of *Lepidopus fitchi* (SIO 62-171), a 750 mm female; inset left, ventral view showing pelvic spines; inset right, anus and triangular second anal spine.

iridescent in life). Head darker than body, uniformly brown, except for black flecks ventrally and on the opercles. Body with numerous subcircular black flecks, larger and more prominent ventrally. Posterior to anus, flecks on lower sides tend to line up in rows (Fig. 5). Pectorals and caudal uniformly dark. Dorsal dusky, darker toward margin. Anal membrane dusky.

Etymology. From the Latin *manis*, meaning ghost, or soul of the departed, in reference to the ghost-like appearance produced by the large eyes.

Distribution. Known only from the holotype from Isla Isabela, Galápagos Islands (Fig. 1).

Identification. The number of vertebrae and dorsal and anal rays of the holotype of *L. manis* is outside the range of all other described species except *L. dubius* (Figs. 2–4). However *L. manis* differs from *L. dubius* in other respects. In addition to the characters used in the key, *L. manis* differs in its larger eye, 4 versus 5.4 in head. Although the illustration of the holotype of *L. dubius* is not very informative on this point (Parin and Mikhaylin, 1981: 204), it appears that its caudal fin is much smaller than that of *L. manis*.

Lepidopus fitchi sp. nov.

(Fig. 6)

Lepidopus xantusi, not of Goode and Bean: Jordan and Evermann, 1898: 2843. Jordan and McGregor, 1899: 276. Jordan and Starks, 1907: 70–71. Fitch and Lavenberg, 1968: 107–109. Fitch and Gotshall, 1972: 12–18. Miller and Lea, 1972: 190. Hubbs *et al.*, 1979: 27. Robins *et al.*, 1980: 55. Mikhaylin, 1982: 24.

Material. Holotype, SIO 62-171. A 750 mm female from México, Baja California Norte, about 1.5 km north of North Coronado Island. Taken on the bottom by hook and line in 183 meters. Paratypes: SIO 48-270, 373 mm; SIO 49-134, 663 mm; SIO 50-128, 727 mm; SIO 54-31, 770 mm; SIO 54-34, 826 mm; SIO 55-12, 747 mm; SIO 55-29, 870 mm; SIO 55-53, 696 mm; SIO 55-82, 736 mm; SIO 57-142, 745 mm; SIO 58-52, 760 mm; SIO 58-221, 773 mm; SIO 60-58, 736 mm; SIO 60-65, 758 mm; SIO 60-74, 790 mm; SIO 60-148, 2(740–795 mm); SIO 60-177, 702 mm; SIO 61-5, 3(729–818 mm); SIO 62-171, 770 mm; SIO 63-398, 2(225–245 mm); SIO 64-325, 755 mm; SIO 65-275, 415 mm; SIO 70-126, 761 mm; SIO 71-69, 476 mm; SIO 72-209, 4(225–428 mm); SIO 73-58, 852 mm; SIO 75-394, 812 mm; SIO 81-71, 263 mm, all from California and Lower California.

Non-paratype material from Ecuador and northern Peru: SIO 64-386, 349 mm; SIO 72-84, 2(148–162 mm), cleared and stained; SIO 81-139, 560 mm; SIO 81-140, 450 mm; SIO 81-141, 2(315–338 mm); UCLA W59-62, 3(55–472 mm).

Additional material used for distribution only: OS5209 Cape Kiwanda, Oregon; SIO 63-998, 43.5 mm; SIO 65-268, 2(370+ –450+ mm) all Gulf of California.

Description. Counts are those of the holotype; data for dorsal, anal and vertebral counts of paratypes are in Figs. 2–4. Proportional values are those of the holotype, followed by the range of the

paratypes in parentheses. Measurements of the holotype and paratypes are in Table 1. D IX, 78; A II, 43; P_1 12; P_2 I, ? (see description); Vertebrae 35+50=85; Br 7; GR 7+10=17.

Body elongate, more so than in *L. manis*. Depth at pelvic insertion 9.9 (9.2–13.3) in standard length, at anal 12.6 (11.4–15.1), at caudal peduncle 134 (111–167). Head large, 4.7 (4.4–7.1) in standard length, eye moderate, 5.6 (5.0–6.7) in head, interorbital 1.4 (1.3–1.8) in eye, snout 2.9 (2.5–3.1) in head. Mouth large, maxillary extends to anterior margin of pupil. Lower jaw projecting and hooked upward slightly at tip. Teeth flattened, lanceolate, their margins entire, without barbs. An outer row of 27 teeth and an inner row of 3 fangs on left premaxillary. Dentary teeth on left side 18 (21–30 in four other specimens with dentition intact). Vomer and tongue edentulous, palatine with a row of minute teeth along ventral margin. Nostril a slit, about one-fourth snout length before eyes.

Upper profile of head rises at about 30° from snout to top of eyes, then flattens to a more gradual slope to dorsal origin. Interorbital concave, with a trough between elevated ridges. Degree of concavity varies from very deep over anterior eye margin to almost flat. Trough terminates at confluence of frontal ridges just behind posterior margin of eye. No medial sagittal crest; a short ridge before dorsal origin formed by first pterygiophore. Posterior margin of opercle with a shallow concavity at level of pectoral base.

Dorsal origin slightly in advance of junction of opercle with head. Rays at middle of fin 5.0 in head, posteriormost rays about one-half as long. None of the dorsal rays segmented or branched. Examination of a cleared and stained dorsal fin indicates that the first nine rays are fused and succeeding ones bilateral. The number of spines was not confirmed for the holotype or the remaining specimens.

Anal origin in middle third of body. First several anal rays under skin in specimens larger than 249 mm. Usually 23 to 27 rays are externally obvious, joined by a membrane, and capable of being elevated above the body outline. Anal fin always preceded by two spines but only the second externally obvious. Caudal lunate and well developed, but less broad than in *L. manis*, upper lobe 0.70 (0.40–1.06) in caudal span.

Pectoral insertion below midline of body but above lower margin of orbit. Lower rays longer than upper, so that margin forms a backward slope. Pectoral length 2.6 (2.0–3.2) in head. Pelvic fins represented by a pair of flattened, plate-like spines inserted 4 snout lengths before vent. Two buried, rudimentary soft-rays on each side can be seen on the two cleared and stained specimens (SIO 72-84).

Lateral line begins about one-half eye diameter below third or fourth dorsal ray, slopes gently downward to a level just above the body midline, then drops gradually posteriad reaching the midline over the vent, continuing downward to end on caudal peduncle near ventral margin of body.

Color in alcohol. Uniformly dark in holotype but varies in other specimens from uniformly dark with scattered large melanophores to a light brown with a dusting of smaller melanophores, especially on abdomen and opercle. Some specimens retain a dull silvery sheen along the abdomen. Dorsal is lighter at base, becoming black along upper margin. Lateral line darker than body. Caudal black or nearly so. Pectoral fin light near insertion, becoming darker near margin.

Etymology. Named in honor of the late John Fitch, indefatigable student of California fishes.

Distribution. Cape Kiwanda, Oregon (45°12′N, 123°57′W) to the Gulf of California, and Ecuador to northern Peru. The hiatus between about 20°N and 5°N in the distribution of *L. fitchi* appears to be real, and not due to lack of collecting effort. This distribution (Fig. 1) is a classic example of an antitropical distribution as defined by Hubbs (1952).

Remarks. *Lepidopus xantusi* was named by Goode and Bean (1895), with the holotype USNM 10115, collected by John Xantus at Cape San Lucas. No description was offered, the indication being figure 213 in the atlas. Until now, all subsequent records of *Lepidopus* from the eastern Pacific have been referred to that nominal species. Tucker (1956) pointed out that the number of dorsal rays shown in Goode and Bean's illustration fits *L. caudatus*, as do the proportions, and suggested that *L. xantusi* Goode et Bean might be a synonym of *L. caudatus*. Mikhaylin (1982), on the basis of information supplied by us, suggested that the name *L. xantusi* would prove to be invalid and that the species should be redescribed.

The holotype of *L. xantusi* is now in two pieces.

However the vertebral, dorsal, and anal ray numbers are determinable. These are 110, 102, and 61, respectively. These counts fit only *L. caudatus*. Moreover, they agree with those of the North Atlantic population (Mikhaylin, 1977). If the specimen is from Cape San Lucas (and nothing in the National Museum of Natural History records suggests that it is not) it is the only specimen of *L. caudatus* reported from the eastern Pacific. It is possible that there is another species of *Lepidopus* in the eastern Pacific with the counts of *L. caudatus*, but the condition of the small, damaged holotype of *L. xantusi* is too poor to allow a determination. However, it should be noted that the fangs of the holotype are not barbed, as in *L. caudatus*, but we do not know how variable the character is among Atlantic specimens. *Lepidopus xantusi* Goode et Bean is here referred to the synonymy of *L. caudatus* (Euphrasen). It is clear that eastern Pacific material previously referred to *L. xantusi* is not conspecific with the holotype of that species, and a new name is now proposed. Brauer's 1906 problematic record of *L. xantusi* from the Gulf of Guinea has been referred to *L. dubius* (Parin and Mikhaylin, 1981).

Variation. Fitch and Gotshall (1972) reported two specimens from Peru that differed in counts from the northern population and suggested that they might represent a distinct species. Our material (Figs. 2–4) confirms the distinctiveness of the northern and southern populations. There are significant differences ($p<0.05$, t-test) in mean numbers of vertebrae and fin rays. Fitch and Gotshall (1972) mentioned "other observable differences" but we have been unable to find any differences in addition to the meristic ones just mentioned. Mikhaylin (1982) suggested that the northern and southern populations had possibly reached "a species level of differentiation," based on an absence of overlap in his data for number of fin rays and vertebrae. However, our data do show overlap in these features (Figs. 2–4) as well as in all morphometric measurements taken (Table 1). The differences between the populations of *L. fitchi* parallel those between the northern and southern populations of *L. caudatus* in the eastern Atlantic, which Mikhaylin (1977) suggested had diverged at the subspecies level. One of the most vexing problems for systematists is assessing the significance of differences between allopatric populations, and in the absence of any genetic information, or non-overlapping meristic character, or other difference, we feel that no purpose would be served at present by naming the southern population of *L. fitchi*.

Ecology. Our California material of *L. fitchi* falls into two size classes; three specimens from two stations range from 230–265 mm and the remainder are larger than 650 mm. The smaller specimens were taken by midwater trawls fishing no deeper than 100 to 150 m. The large specimens were either taken by hook and line on or near the bottom in 175–300 m or found moribund at the surface. These observations accord well with those presented by Fitch and Lavenberg (1968) who discuss other aspects of the life history of the species. Most of our specimens were taken in late winter and early spring; 13 from February through May, 4 from June through September, and none from October through January. This difference is real (Chi-square for even distribution by season or month significant at $p<0.025$), but its cause is not clear. It may represent an onshore-offshore or latitudinal movement but we cannot eliminate fishing effort as a cause.

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Lepidopus 属（タチウオ科）の分類と東太平洋産の2新種

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タチウオ科 *Lepidopus* 属の5既知種のうち3種が東太平洋に出現する．ガラパゴス諸島から得られた1個体に基づいて *Lepidopus manis* sp. nov. を記載した．Goode and Bean (1895) によりバハカリフォルニアのケイプサンルカスから得られたと思われる完模式標本に基づき記載された *L. xantusi* は *L. caudatus* (Euphrasen, 1788) に該当する．それ以後これまで，*L. xantusi* のもとに報告されて来たものは今回新たに記載された *L. fitchi* sp. nov. に該当する．*L. fitchi* はオレゴン沖からカリフォルニア湾にかけて分布し，また不連続にエクアドル南部沖からペルー北部沖にかけて出現する．*Lepidopus* の記載種5種の検索を示し，*L. caudatus* の形態的特徴をも記述した．*L. caudatus* と *L. fitchi* の地理的変異についても論じた．